OUTBREAK SPOTLIGHT….

"Outbreak Spotlight" is a regularly appearing feature in the *Indiana Epidemiology Newsletter* to illustrate the importance of various aspects of outbreak investigation. The event described below illustrates how routine reportable disease surveillance can indicate an outbreak and the potential for a seemingly small outbreak to become quite large.

Background

On November 8, 2004, a representative from the Porter County Health Department (PCHD) notified the Indiana State Department of Health (ISDH) that the health department had received an increased number (5) of confirmed *Salmonella type D* laboratory reports. Several of the cases had eaten at Restaurant A, which is located near a major interstate highway. The hours of operation are 6:00 a.m. to 10:00 p.m., seven days per week.

Approximately 30 more cases were identified over the next few days, including one from Wisconsin. The owners voluntarily closed the restaurant on November 9, 2004, pending further investigation.

Epidemiologic Investigation

The PCHD and the ISDH initiated a collaborative investigation of the outbreak. The ISDH developed a questionnaire that documented illness history and foods eaten on the days in question, which was then forwarded to the PCHD. PCHD staff members conducted interviews and completed questionnaires for the following groups: patrons reporting symptoms, employees with symptoms, employees with positive lab results, and patrons who did not become ill but had accompanied someone who did present symptoms (controls). Completed forms were forwarded to the District 1 ISDH field epidemiologist for analysis. A case was defined as any previously healthy person who ate or worked at Restaurant A and became ill with diarrhea and/or vomiting on or after October 24, 2004.

Thirty-five cases were identified. Eighteen were confirmed by positive stool cultures. The ISDH and the PCHD notified the Wisconsin Department of Health and Hygiene of one case who was a Wisconsin resident. Cases ranged in age from less than 1year to 93 years of age, with the mean age being 46 years. The predominant symptoms included diarrhea (99%), cramps (86%), nausea (35%), headache (35%), vomiting (34%), blood in stool (23%), and fever (34%). Five cases were hospitalized. The median incubation was 24 hours (range: 6 to 72 hours).

Since the restaurant is located near a major interstate, outbreak information was posted on the Centers for Disease Control and Prevention (CDC) Epi-X Web site, a secure electronic information exchange. The PCHD also notified the local media.

Environmental Assessment

The PCHD inspected Restaurant A on November 8. Six critical violations were found, including the removal of a hand sink in the kitchen area. The restaurant voluntarily closed on November 9 until further details of the outbreak could be established.

All restaurant employees were requested to submit a stool specimen. Four employees cultured positive for *Salmonella enteritidis*. Although the restaurant was closed at the time the positive results were reported, these workers were not allowed to return to work until two consecutive stool samples, taken not less than 24 hours apart, were negative. Two of the positive employees were asymptomatic. The others had onset dates in early November after some patrons of the restaurant reportedly were ill. Two of the employees were classified as food handlers. One of the positive employees had begun employment at another establishment. The PCHD visited this second restaurant to discuss the restrictions for that employee and provide education on *Salmonella* infection and hand washing. No cases were reported at the second establishment.

Prior to reopening, the PCHD environmental staff conducted food safety training for Restaurant A staff and conducted another inspection of the restaurant on November 15. The hand sink was reinstalled and all critical violations were corrected. The restaurant reopened on November 16. The PCHD observed kitchen operations on the first day of reopening and found no violations. No further cases or complaints were reported.

Laboratory Results

The PCHD worked with Porter Hospital (Valparaiso campus) to collect and analyze stool samples, and results were forwarded immediately to PCHD staff. Eighteen cases, including four restaurant employees, tested positive for *Salmonella enteritidis.* Positive isolates were sent to the ISDH Laboratories, which forwarded them to the Michigan Department of Community Health Bureau of Laboratories for pulsed field gel electrophoreses (PFGE) testing. All isolates exhibited a common pattern, strongly indicating a common source.

No food samples were available for testing.

Conclusion

The investigation revealed that an outbreak of gastroenteritis occurred at Restaurant A between October 24 and November 9, 2004. The causative agent was *Salmonella enteritidis*. *Salmonella* is a bacterium that is most commonly found in the intestines of animals. People often become infected by eating foods contaminated with the bacteria, usually foods of animal origin, such as meats, poultry, and eggs, or by direct contact with these animals. *Salmonella* is also shed in the stool of infected cases. This can lead to transmission of the organism, person to person, via the contaminated hands of an individual or a contaminated object.

No particular food vehicle was identified as the source of this outbreak. The epidemic curve, which depicts onset dates of cases, indicates a continuous source, compatible with repeated or intermittent transmission. In several instances, the patrons ate the same meal on the same day; however, one would become ill and not the others. No common meal was identified as a source of illness among the symptomatic cases. However, four employees, two of whom were asymptomatic, tested positive for

Salmonella enteritidis, with the same PFGE pattern as the ill patrons. Therefore, it is likely that illness may have been introduced by an asymptomatic employee and transmitted through intermittent shedding in the stool. The removal of the hand sink may have enhanced this situation. It was also difficult to exclude ill employees from preparing and serving food, because at least two were asymptomatic and not identified until laboratory testing results became available.

The ISDH extends its appreciation for the quick response and professionalism demonstrated by the PCHD and Porter Hospital. Restaurant A employees and management staff were very cooperative during the investigation and voluntarily closed the restaurant until the investigation was completed. The timely actions taken by these organizations likely reduced the number of cases associated with this outbreak.

In general, most foodborne outbreaks of *Salmonella* can be avoided by strictly adhering to the following practices:

1. Thoroughly wash hands with soap and water before, during, and after food preparation.
2. Educate employees about proper hand washing after using the restroom.
3. Exclude employees from working while ill with diarrhea and/or vomiting until symptoms have ceased.
4. Thoroughly cook all food items derived from animal sources, particularly poultry, pork, egg products, and meat dishes.
5. Use separate utensils, equipment, and preparation surfaces for raw meats and eggs and ready-to-eat-foods, such as lettuce and vegetables.
6. Use pasteurized or irradiated egg products to prepare dishes in which eggs would otherwise be pooled before cooking or when the food item containing eggs is not subsequently cooked.
7. Store foods at proper refrigeration and holding temperatures.